



# ROUNDUP

NASA LYNDON B. JOHNSON SPACE CENTER

HOUSTON, TEXAS

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Friday, November 25, 1977



**SMALL AND WONDERFUL** — Such an ordinary thing as running water becomes the object of incredible fascination for young David, as he views the sight for the first time.

## David gets his suit: Those people behind the scenes tell their stories

We talk a lot about using space technology for the benefit of mankind. We discuss spinoffs, future possibilities, and new frontiers to explore. Many of these efforts succeed without even our own employees being aware of them, but here at JSC is an example of the real thing: the dedication, the teamwork, the coordinating effort, the technical problems. But most significant is the fact that the multi-expertise — the motley of specialized skills and technical knowledge available throughout the Center — were drawn together to turn a mere concept into a workable reality!

How many people were involved in the project of creating the Mo-

bile Biological Isolation System (MBIS) for the little boy affectionately known to the world only as "David, the bubble baby?" Well, when you consider the uniqueness of the boy and the project, the entire operation had to be handled with the innumerable quality checks of a piece of flight equipment. There is no margin for error.

If you buy a blouse at the store and a seam is sewn wrong, it is hardly a matter of life or death. The question here was one of survival, and from that standpoint a great many people had to be involved: a project coordinator to locate the elements of expertise and keep open the lines of communica-

tion; an aid to the coordinator to handle some of the paperwork, legalities, work with the people from the hospital, and help to write program requirements; a crew systems engineer to come up with the design of components for the suit and the transporter and to see that this design was comfortable as well as functional; a microbiologist to solve such problems as entry and exit from a sterile environment; manufacturers to build the suit and construct the components; quality assurance, operations, and safety personnel to look over everybody's shoulder and make sure specifications are being followed and, mainly, that the specifications are correct; documentation personnel to write up every step of the project; quality control and reliability personnel to check and double-check every piece of equipment; and, of course, the hospital nurses and doctors who best understood David's delicate condition and who had to be trained in the use of the garment as well as set up the constraints in its construction.

Who were some of these dedicated individuals, many of whom gave much of their personal time to the project, and what specific problems did they encounter in their various fields?

Fred Spross was a member of the Biomedical Applications Team of the Life Sciences Directorate at the time of the initial receipt of a

*(Continued on page 4)*

## Tenth group of astronaut applicants are interviewed and tested at JSC

The tenth group of Space Shuttle astronaut applicants reported to the JSC on Nov. 14, for a week of physical examinations and individual interviews.

This group includes 24 mission specialist applicants and one pilot applicant. Eight of the applicants in this group are military and one is a woman.

The name, age, degrees and/or military rank, birthplace (BP), and place of employment or current duty station (DS) of the individuals in this tenth group are:

Atwood, William B., 30, Ph.D.; BP — Nashua, N.H.; DS — CERN, EP Division, Geneva, Switzerland.  
Belcher, Robert C., 28; BP — Del Rio, Tex.; DS — University of Texas (graduate student), Austin, Tex.

Bird, Ronald S., 35, LCDR, USN, Ph.D.; BP — Ann Arbor, Mich.; DS — Pacific Missile Test Center, Pt. Mugu, Calif.

Buchli, James F., 32, Capt., USMC; BP — New Rockford, N. Dak.; DS — Naval Air Test Center, Patuxent River, Md.

Cox, John T., 33, Ph.D.; BP — New York, N.Y.; DS — NASA/JSC, Houston, Tex.

Cruce, Andrew C., 34, Ph.D.; BP — Fresno, Calif.; DS — Naval Air Test Center, Patuxent River, Md.

Diner, David J., 24, Ph.D.; BP — New York, N.Y.; DS — Caltech, Pasadena, Calif.

Ephrath, Ayre R., 35, Ph.D.; BP — Czechoslovakia; DS — University of Connecticut, Storrs, Conn.

Galik, Richard S., 26, Ph.D.; BP — Hackensack, N.J.; DS — Rittenhouse Labs, University of Pennsylvania, Philadelphia, Pa.

Gregory, Frederick D., 36, Maj., USAF (Pilot); BP — Wash. D.C.; DS — Armed Forces Staff College, Norfolk, Va.

Hagar, Hamilton, Jr., 37, Ph.D.; BP — New York City, N.Y.; DS — Jet Propulsion Laboratory, Pasadena, Calif.

Jones, John F., Jr., 31, Ph.D.; BP — Detroit, Mich.; DS — Sandia Laboratories, Livermore, Calif.

Lichtenberg, Byron K., 29; BP — Stroudsburg, Pa.; DS — MIT, Cambridge, Mass.

Maine, Richard E., 26; BP — Louisville, Ky.; DS — NASA/Dryden Flight Research Center, Edwards AFB, Calif.

McNair, Ronald E., 27, Ph.D.; BP — Lake City, S.C.; DS — Hughes Research Laboratories, Malibu, Calif.

Ortega, Joseph K. E., 31, Ph.D.; BP — Trinidad, Colo.; DS — University of Colorado, Boulder, Colo.

Rhoads, Harold S., 31, Capt., USAF, Ph.D.; BP — Lexington, K.Y.; DS — 4950th Test Wing, Kirtland AFB, N. Mex.

Richards, David W., 34, M.D., Ph.D.; BP — San Pedro, Calif.; DS — North Broward Emergency Physician, Ft. Lauderdale, Fla.

Schlein, Paul B., 33, LCDR, USN, Ph.D.; BP — Stockton, Calif.; DS — NAVELLEX, Wash., D.C.

Sessoms, Alan L., 30, Ph.D.; BP — New York, N.Y.; DS — Harvard University, Cambridge, Mass.

Strada, Joseph A., 32, LCDR, USN, Ph.D.; BP — Philadelphia, Pa.; DS — SAMSO, Los Angeles Air Force Station, Calif.

Sullivan, Kathryn D., 26; BP — Paterson, N.J.; DS — Dalhousie University (graduate student), Halifax, Nova Scotia.

Vieira, David J., 27, Ph.D.; BP — Oakland, Calif.; DS — Lawrence Berkeley Lab, University of California, Berkeley, Calif.

Walton, James R., 30, Capt., USAF, Ph.D.; BP — Ithaca, N.Y.; DS — 366th Tactical Fighter Wing, Mountain Home AFB, Idaho.

Weir, Charles R., 29, Lt., USCG; BP — Sidney, Neb.; DS — Oceanographic Unit, U.S. Coast Guard, Wash., D.C.

## JSC enters into several contracts, negotiations

NASA/JSC has recently been involved in several contract negotiations with various firms and industries, many of which are directly connected with JSC.

For example, JSC has selected ILC Industries, Inc. of Frederica, Maryland, for negotiations leading to a contract for development, production, and support of Space Shuttle crew equipment and stowage provisions.

Estimated value of the cost-plus-fixed-fee contract will be \$1.2 million. The contract will begin January 2, 1978 and end September 30, 1980.

Covered under the contract will be crew clothing "shipsets," Orbiter survival kit, crew lifevest, personal hygiene kits, ancillary crew provi-

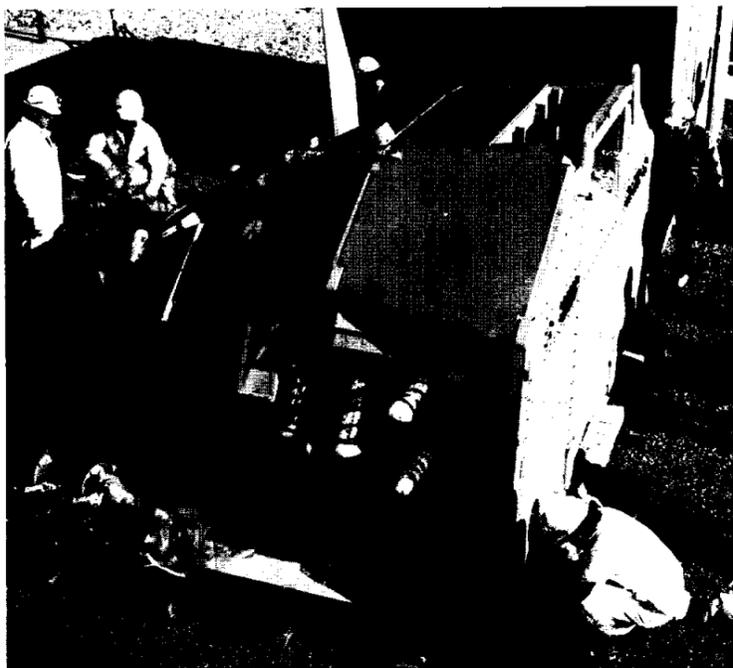
sions, and Orbiter stowage provisions. The contract will also cover replacement, servicing and maintenance, and special studies involving the crew equipment.

JSC has also signed a supplemental agreement to the contract with the Ford Aerospace and Communications Corporation in Houston covering maintenance and operations, ground data hardware and software engineering at the Center.

Also covered under the contract are systems engineering and integration, logistics and reliability for the Mission Control Center and for other ground-based data systems managed by JSC.

The supplement to the cost-plus-award-fee contract is valued at

*(Continued on page 2)*



**NEW EQUIPMENT FOR WSTF** — This is the forward reaction control subsystem which arrived at White Sands.

## White Sands gets FRCS

The NASA Space Shuttle Orbiter craft's forward Reaction Control Subsystem (FRCS) has arrived at the NASA White Sands Test Facility (WSTF) for a series of tests designed to prove the system design. Consisting of 14 primary thrusters and two vernier thrusters, the FRCS tests are scheduled to begin in early 1978.

The aft RCS is scheduled to arrive at WSTF in late December for similar tests, preparatory to the Shuttle's first orbital insert slated for early 1979.

The total reaction control subsystem — both forward and aft — has 38 bipropellant primary thrusters and six vernier thrusters, which provide attitude control, and three-axis translation during the insertion, on-orbit, and entry phases of the Shuttle craft's flight.

Tests of both the forward and aft RCS will involve simulated flight missions as would be encountered in actual flights of the Shuttle spacecraft. The FRCS will be tested in Test Stand 328.

## Contracts . . .

(Continued from page 1)

\$2,253,113, bringing the total cumulative contract value to \$49,766,449.

In recent contract negotiations between JSC and the Taft Broadcasting Corporation, engineering, installation, maintenance and operation of television systems would be covered in the proposed cost and fixed-fee contract to run from January 1 through December 31, 1978. The estimated value of the contract is \$981,429 and two additional one-year optional extensions will be provided.

In addition, NASA and the St. Regis Paper Company in New York City have agreed to use NASA's Landsat satellite to demonstrate the technical and economic effectiveness of monitoring commercial timber resources scattered throughout a five-state area from a vantage point 900 kilometers (560 miles) in outer space.

JSC will provide the technical expertise in the development of an automatic classification system covering forested areas. The Landsat data will be computer-processed into a forest resource information system for use in the management of the St. Regis timberland reserves.

The objectives of the cooperative venture are to identify kinds of trees, to estimate timber volume and productivity, to implement techniques for detecting changes in the health and growth of forests, and to integrate the new technology with existing operational data bases (aerial photography and survey information).

Remotely sensed forest resource information (that is, Landsat data) will be provided by JSC through the Laboratory for Applications of Remote Sensing (LARS), Purdue University, Lafayette, Indiana. LARS will be operating under a separate JSC contact.

## SAR issues Dec. call for papers

NASA/JSC and the Physical Science Laboratory at New Mexico State University are co-sponsoring a Synthetic Aperture Radar (SAR) Technology Conference March 8-10, 1978, at Las Cruces, New Mexico.

Papers relating to all aspects of recent technological SAR developments are now being solicited for this conference. Innovations applicable to Earth Observations Remote Sensing are particularly sought.

Prospective authors are asked to submit a short abstract (350 words) by Dec. 15, 1977. Some suggested topics for papers are: antenna technology and performance, SAR calibration, radio frequency components, and SAR processor design.

Interested persons should contact Harold Nitschke, X-3073, or Dave O'Herren, X-4261 for details.



**SUPERIOR PERFORMANCE AWARD PRESENTED** — Dr. Maxime A. Faget, Director of Engineering and Development, recently presented a Superior Performance Award and a retirement certificate to Dr. W. Richard Downs, formerly of the Structures and Mechanics Division. Downs, who retired from JSC Sept. 7 was recognized for his achievements in solving corrosion problems in spacecraft subsystems and for his contributions to advanced space systems studies. Although he suffered a massive stroke earlier this year which forced his retirement, "Doc," as he is affectionately known, has not lost his sense of humor and his keen interest in all aspects of our space program. Pictured with Downs on the right is Aleck C. Bond, Assistant Director for Program Support, E&D, and on the left, Faget.

## Huntsman is very highly respected

David P. Huntsman is a senior from the University of Cincinnati majoring in aerospace engineering. He is currently assigned to the Support System Section of the Payload Support Branch, Payload Operations Division and will graduate June 11, 1978.

When Huntsman first joined the section, his duties were those normally expected of a senior Co-op student. However, due to some unexpected changes in the section's manpower and an increased workload, it was necessary to assign Huntsman several tasks normally reserved for more experienced full-time junior engineers. It was a sink or swim situation.

The section soon found out that Huntsman could more than adequately handle his assigned tasks. Huntsman represented NASA as the point of contact for development of operations requirements for the Interim Upper Stage (IUS). Acting in this capacity, Huntsman worked with representatives of Boeing, Rockwell, SAMSO, and Aerospace

to develop the operations section of the IUS to the orbiter Interface Control Document (ICD). Huntsman wrote portions of the ICD, evaluated the inputs of other organizations with respect to applicability and accuracy, and coordinated the efforts required to organize and publish the preliminary operations section of the ICD.

In addition, Huntsman acted as the full-time secretary for several IUS operations working group meetings, being totally responsible for organizing the meetings, taking the minutes, and putting together the final reports. In fact, at the last meeting Huntsman was assigned the task of training another Co-op in the same duties.

Huntsman also carried out additional responsibilities as a junior engineer on the IUS communication system. Huntsman was responsible for reviewing the current IUS communications system design to ensure that it would provide the operational capability required to support the NASA IUS missions.

## Evelyn Williams earns top secretary award

Evelyn J. Williams is an unusually poised employee who responds to new challenges with enthusiasm. She is a clerk-typist assigned to the Manufacturing and Test Office, Orbiter Project Office, providing secretarial support to the Manufacturing Office, Test Office, and Maintenance Engineering Office.

Within the past few months, Williams has provided full secretarial support to the manager of the Manufacturing and Test Office in addition to her regular duties. She supervised the work of a summer aid and one other part-time clerical employee during this period and showed superior judgment and insight in identifying real and potential problems by counseling with the employees and providing guidance to them, which significantly increased their productivity.

One employee had made the statement that she did not want to work, but Williams recognized that the employee was simply overwhelmed in her first job and provided help which improved the employee's performance and increased her confidence in her ability to handle the job.

Williams has a strong sense of responsibility about her own work and the work of the organization. She learns quickly and requires only a minimum amount of guidance.

She has provided strong help by maintaining current and accurate record of travel expenditures and funds available. She is effective in checking trip schedules to increase car sharing and processes trip reports to maximize the benefits gained from these trips. Her skill in handling this task has afforded supervisory personnel a sound basis on which to schedule meetings and manage travel requirements in an organized manner.

Williams has displayed outstanding secretarial skills. She developed a filing system adapted to the needs of the office, eliminated redundant files, updated needed documents, and developed a complete catalog of sources for documents and correspondence not filed by the office. She has shown particular discretion in handling sensitive personnel matters and in dealing with assignments related to award fee deliberations.

Williams has a delightful personality and works extremely well under pressure. She is tactful, and her eagerness to help others has made her a real asset to her organization, especially in her personal and telephone contacts with senior NASA managers and top management personnel of various contractor organizations.

For these reasons, Center Director Christopher Kraft recently presented Williams a plaque and a \$100 check to honor this lady of obvious potential who is working toward a degree in business administration at the University of Houston, Clear Lake City.



Evelyn J. Williams

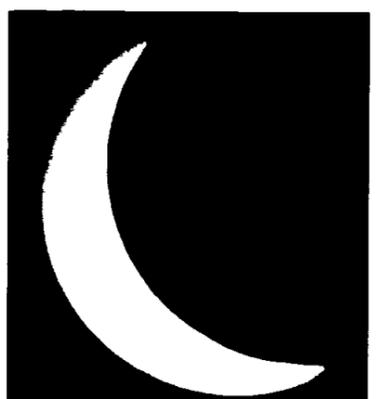
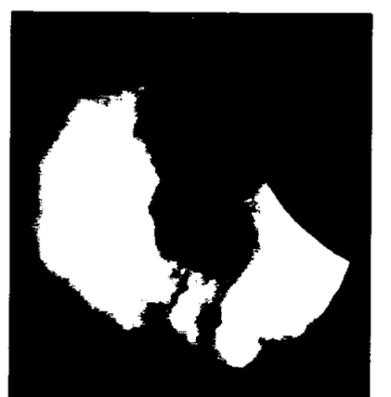
## Solar eclipse is still exciting despite clouds

High in the Andes Mountains of Colombia, 10,000 feet above sea level, is the little town of Guatavita, where 22 people went to view a total solar eclipse. The trip was sponsored by the JSC Astronomical Society, and the photographs shown here were taken by Society member Paul Maley.

Unfortunately, it was not the best day for taking photographs of the phenomenon, the weather being somewhat overcast. But photographers were able to get pictures right to the point where 96 percent of the Sun was covered by the Moon.

Then, just two and a half minutes before totality, a cloud moved into the area and obscured the climax of the event.

The photographs that were taken, however, are still spectacular, and enthusiasts are now looking forward to going to Montana in Feb. 1979 to view the next such event.



WEEK OF NOV. 28 — Dec. 2

**MONDAY:** French Onion Soup; Weiners & Macaroni; Round Steak w/hash browns; Meatballs & Spaghetti (Special); Okra & Tomatoes, Carrots. Selection of Salads, Sandwiches, & Pies Daily.

**TUESDAY:** Beef & Barley Soup; Shrimp Creole; Ground Pork Steak; Beef Stew; Fried Chicken (Special); Mixed Vegetables, Stewed Tomatoes, Buttered Rice.

**WEDNESDAY:** Seafood Gumbo; Fried Perch; New England Dinner; BBQ Plate; 8-oz. T-Bone Steak; Shrimp Salad; Swiss Style Steak (Special); Italian Green Beans, Beets, Lima Beans.

**THURSDAY:** Cream of Chicken Soup; Turkey & Dressing; Enchiladas w/chili; Weiners & Beans; Stuffed Bell Pepper (Special); Zucchini Squash, Peas.

**FRIDAY:** Seafood Gumbo; Broiled Flounder; ¼ Chicken w/peach half; Shrimp Salad; Salisbury Steak (Special); Shrimp & French Fries; Mixed Vegetables, Cabbage, Breaded Okra.

WEEK OF Dec. 5 — Dec. 9

**MONDAY:** Chicken & Rice Soup; Texas Hots w/beans; BBQ Ham Steak; Veal Parmesan; Beef & Macaroni (Special); Spinach, Carrots, Au Gratin Potatoes. Selection of Salads, Sandwiches, & Pies Daily.

**TUESDAY:** Tomato Soup; Baked Chicken; BBQ Spare Ribs; Mexican Dinner (Special); Broccoli, Spanish Rice, Ranch Beans.

**WEDNESDAY:** Seafood Gumbo; Red Fish; Liver w/onions; BBQ Ham Steak; Shrimp Salad; Meatloaf (Special); BBQ Plate; Brussel Sprouts, Green Beans, Whipped Potatoes.

**THURSDAY:** Beef & Barley Soup; Chicken & Dumplings; Corned Beef w/cabbage; Smothered Steak (Special); Cauliflower, Cabbage, Parsley Potatoes.

**FRIDAY:** Seafood Gumbo; Pork Chop; Creole Baked Cod; Ham Steak; Seafood Platter; Salmon & Tuna Croquette (Special); Corn, Green Beans, Beets, Shrimp Salad.

# JSC to get checkout gear

In January 1978, JSC will be receiving the Marshall Mated Elements System (MMES) from the Marshall Space Flight Center. The MMES will be capable of checking out all of the avionic functions of the Shuttle Transportation System electronically and will be incorporated into the total system at JSC.

The total system is called SAIL, an acronym for Shuttle Avionics Integration Laboratory. Avionics are the electrical and electronic systems which control the Shuttle during flight and send signals to the astronaut pilots and ground controller who monitor the mission.

The MMES will provide a vital function to SAIL in allowing all the Shuttle avionics systems to work together. SAIL will be able to simulate a Shuttle flight beginning 20 minutes before launch under normal or abnormal conditions.

The MMES simulators can simulate the failure of almost any part of the Marshall Shuttle elements. Experts can watch how all the Shuttle systems react with one of the main engines out or with high temperatures and high pressures being recorded in vital areas.

JSC is providing the Orbiter simulator, of course, and the computer that simulates Shuttle vehicle dynamics. With the arrival of the MMES, dress rehearsals of Space Shuttle Earth orbital missions will begin.

## League Sports

The 1977 Softball comes to a close. Final standings are:

**Mens A League** — None.

**Mens B League** — The Pirates beat the Rats by a score of 14-2; the Mets beat Univac 23-7. Then Univac played the Rats for a 10-7 win, finishing 3rd overall.

The Pirates and the Mets played for first and second place and had a wild 16-15 game with the Mets coming out on top.

**Mens C League** — The first place Tuesday team, the Reds, beat the second place Wednesday team, T.S.D. The first place Wednesday team, the Desperados, beat the second place Tuesday team, Northrop, to set up a battle between the first place teams. T.S.D. then played Northrop for third place and came out ahead while the Desperados finished first in their win over the Reds.

### Womens League

	Wins	Losses
Charlie's Angels	8	1
We're Good	6	2
McAttack	3	4
WYSIWYG	2	5
Slippers	0	7
<b>Mixed League</b>		
Hems and Fems	6	2
Happiness	5	3
IITYWYBMD	4	3
Jocks and Jills	0	7

### TICKETS

The following tickets are available at the Bldg. 11 Exchange Store from 10 a.m.—2 p.m. Monday — Friday.

**Astroworld** — Astroworld is open weekends from 10 a.m. to 6 p.m. through November. Adult & children's tickets are available for \$5.95 each. That's still a \$2 discount.

**Dean Goss Dinner Theater** — The comedy play "Right Bed, Wrong Husband" is still featured at the Dean Goss Dinner Theater. Tickets are now being sold for \$16 per couple or \$8 per person.

**Six Flags** — Six Flags is open weekends through November from 10 a.m. to 8 p.m. Adult & children tickets are \$6.75 each. That's a \$1.20 discount.

**Disney Magic Kingdom Club** — Free membership cards.

### SKIING LESSONS

Learn to ski on a new moving surface trainer! The unique mechanical ski slope pictured has two separate moving belts with a surface that feels like real snow. The British-built ski trainer can be elevated from 8° to 22° and the speed is variable from 0 to 30 mph to simulate a fast run or a beginner's slope.

Ski Houston, 14609 Kimberly Lane is offering a special group package through the Gilruth Recreation Facility. The course consists of a 3-hour lecture class on Tues., Dec. 6, 6:00-9:00 p.m. at the recreation facility and two Saturday sessions on the ski trainer. Those classes will be Saturday, Dec. 10 and 17 at Ski Houston, at their Kimberly address, off Dairy Ashford between I-10 and Memorial.

Fee is \$27 per person and is payable at the Gilruth Center upon signing up. Ages 5 years and up are welcome.

Checks should be made payable to the Gilruth Recreation Facility. Minimum - 12 students; Maximum - 36 students.

### HOUSTON AERO HOCKEY

Houston Aero Hockey tickets are on sale at the special rates of \$6.50 and \$4.00 through EAA. They are regularly priced at \$8.50 and \$5.50.

Houston Aeros gift cards will be sold in Bldg. 11 to EAA members, who in turn may exchange them at the Aero's Box Office in the Summit for regularly scheduled home games this 77-78 season.

Upcoming home games are with Cincinnati Nov. 25, New England Nov. 30, and Indianapolis Dec. 2.

### CHILDREN'S EAA XMAS PARTY

Plan now for the JSC/EAA Christmas Party for children Dec. 17. Tickets will go on sale Dec. 1 for \$1.50.

### JSC/EAA XMAS DANCE

This year's Christmas Dance will be held at the Gilruth Recreation Center Dec. 2 & 3. Dinner will be served at 6:30-8 p.m. and music will last from 9 p.m. to 1 a.m.

Ticket sales are now on sale at the Building 11 cafeteria from 8 a.m. until 1 p.m. After Nov. 16, sales will continue in Building 45 in room 217 from Glenda Lancon.

The Jerry Van Orchestra and the Dialogue Rock Band will provide the music both nights. Friday night, Dec. 2, Roast Beef will be served and the cost will be \$10 per person. Saturday night, Prime Rib will be on the menu and the cost will be \$15 per person.

Ticket sales are limited to 500 persons each night, so get your tickets early!

### DANCE CLASSES

The JSC Dance Club will sponsor a new 10-week series of classes every Wednesday evening beginning Nov. 16 at the Gilruth Recreation Center. All types of dancing — from Latins and polkas to rock — will be

taught by instructors Bob and Rae Calvert of Calvert Dance Studios.

The advanced class will concentrate on the Whip, Rock, and Swing.

Cost is \$38 per couple. For further information, call Dance Club secretary Billie Fairfax, X-3050.

### RESTAURANT & THEATER CLUB

The Restaurant and Theater Club offers for only \$22.50 per membership a full year of two-for-one meals at over 40 fine restaurants; two-for-one discounts on admission tickets to Houston's best theaters, dinner theaters, and musical arts; a monthly issue of *Party Line Magazine*, Houston's complete entertainment guide; and bonuses for your entire family at hotels, cinemas, wildlife parks, and sporting events.

You will be impressed with the list of fine restaurants, which are included in a brochure from your EAA representative. This club offers a first in programs of this kind in that memberships are honored all week at 15 establishments, weekends and some weekdays at 11 restaurants, and at nearly all restaurants on Sunday.

Contact your EAA representative now for more information.

# Roundup Swap Shop

Swap Shop advertising is open to JSC federal and on-site contractor employees. Goods or services must be offered as advertised, without regard to race, religion, sex or national origin. Non-commercial personal ads should be 20 words or less, and include home telephone number. Typed or scribbled ad copy must be received by AP3/Roundup by Thursday of the week prior to publication.

### CARS & TRUCKS

70 Ford, Ltd. 4-dr, A/C, pwr, 67K mi, xint cond. \$995. Bell, X-2611 or 488-6433.

76 Corvette. Silver/black, leather, pwr brakes & steer, pwr windows, AM-FM stereo, luggage rack, cruise, xint cond, must sell. \$7,650. Stan, X-4328 or 333-2200.

71 Olds wgn. Good work car, no rust, always starts. \$700. 488-1846 evenings.

72 MGB w/ new top; needs valve job. \$1,200. 488-1846 evenings.

77 Monte Carlo. 2-dr, A/C, pwr steer, AM-FM stereo tape/radio, cruise, pwr door locks, pwr seat, 3800 mi w/ 36,000-mi warranty. \$6,000. 482-5237 after 5 p.m.

74 Pontiac Firebird. 350, A/C, auto, pwr steer & brakes, clean. Ellis, X-3048 or 466-5127.

71 Chevy Kingswood wgn. V-8/400, A/C, AM-FM, must sell. \$1,000. Hughes, X-3738 or 482-9598.

68 VW. Needs some work. \$295. 333-3547.

76 Torino wgn. A/C, auto, pwr steer & brakes, 351 V-8, new steel radials. \$3,600. Anderson, X-3566 or 487-4249.

73 Firebird. AM-FM radio, Rallye wheels, new radials, good cond. \$2,000. 482-5237 after 5 p.m.

75 VW Rabbit. 4-speed, A/C, 28K mi, new brakes, cassette, best offer. Gonzales, 481-1918.

### PROPERTY & RENTALS

Lease: 4-br, 2b, 2-car detached garage, fireplace, study, gas grill, walk to Sagement schools. \$395/mo. John, X-4027 or 486-0814.

Lease: New 3-2-2, fireplace, drapes, refrig, etc. Sagement (Wood Meadow). \$395/mo. references. 334-3202 after 5 p.m.

Sale: Large wooded lot in big thicket area. Access to private lake. X-3584 or 474-3386.

Sale: Beach front lot, Sea Isle, West Galveston. Bennett, X-6287 or 488-3579.

Sale: Brookforest 4-2 1/2-2D w/ fireplace, wet bar, formal dining room. Less than \$35/sq. ft! Lockard, 488-8007 (owner/agent).

Galveston West End. 2 BR by-the-sea condo apt. full furn. \$180/wk off-season; \$260/wk in-season. Clements, 474-2622.

Rent: New Galveston Island Jamaica Beach cottage. \$175/wk or \$30/day for weekends. 334-1640 after 6 p.m.

Rent: Lakeside vacation retreat at Cape Royale on Lake Livingston. Tennis, boat launch, golf. 488-3746.

### BOATS & PLANES

Sale: (1) NARCO HSI system. Electric DG010, Nav 114, UGR2A glideslope receiver. All works. \$1,500. (2) Cessna 300. 360 com/200nav, complete w/ indicator & harness. \$600 (3) King KX160. 360 com/100 nav w/ pwr supply but no indicator. Never used since recertified on all channels. \$400. Pruet, X-4491 or 487-4914 after 5 p.m.

71 Lake Buccaneer Amphibian: 680 hrs total time, NARCO nav/com, good cond, but needs exterior paint. \$18,500. McCandless, X-2421 or 334-2100.

For sale: one-third ownership 1966 Comanche 260B. Full IFR, new paint, fresh annual, based at Clover Field. \$9,500. Samonski, X-4823 or 334-1869 after 5 p.m.

Sale: Bass boat, 16 ft., depth finder, 45-HP Evinrude, completely rigged. 334-1486.

### CYCLES

75 Honda CB 550. Mint cond, fairing, other extras, 3800 mi. \$995. Carson, X-4336 or 946-0319.

71 BMW 750. 16K mi, windjammer, CB radio, bags, extra clean. \$1,600. Must sell before Xmas. McKinney, X-6493 or 523-6824.

72 Honda SL 100. \$225. 481-3787.

### STEREOS & CAMERAS

Minolta SRT-101 SLR w/ 58 mm f 1.4 and 35 mm f 2.8 Rokker lenses, leather cases, misc. \$150. Bettner, X-7474 or 482-3725 after 6 p.m.

Magnavox stereo 1500 tuner/amplifier. Includes optional capabilities f/ tape recorder, turntable, headphone set. \$180. Merriam, 488-3806.

### HOUSEHOLD ARTICLES

Sears Elect gas dryer, 4 mo old, harvest gold. \$190. Also Magic Chef gas stove, 6 mo old, harvest gold. \$200. Hughes, X-3738 or 482-9598.

Sterling silver 5-piece tea & coffee service set. New, never used. Cost \$550; will sell f/ \$425. 482-7546.

### MUSICAL INSTRUMENTS

Tenor banjo (Gretch) w/ case. Xint cond. \$85. Johnson, X-2021 or 946-7036 after 5:30 p.m.

Reconditioned upright piano. \$225. 481-3787.

### PETS

Collie puppies. 5 wks old. Free, un-registered. X-5973 or 482-3989.

### MISCELLANEOUS

Outboard motor. Johnson 10 HP, 1956 model, runs good. \$95. Gammon, X-5927 or 471-2542.

Lady's beautiful dark brown fur jacket, size 12-14. Like new. 488-2822.

Cushman electric golf cart. 4-wheeler. \$800. Jim, X-3979.

Outboard motor. Evinrude, 3 HP, good cond. \$65. 481-1348.

Ride-on pwr mower. 8 HP Huffy, twin blades, good cond, 2 yrs old, recently sharpened. Klotz, X-4193 or 488-1514.

Regulation size (4 x 8) pool table complete w/ 4 cues & cue stand. Composition board base w/ leveling adjustments, good cond. \$125. Ed, X-3458 or 332-3709.

Compact Junior fiberglass camping trailer. 13-ft, queen size bed, stove & ice box, like new. \$1,100. 946-5847.

Trailer hitch. Fits 72 Chevy. \$10. Smith, X-4468.

Two bucket seats from Dodge van. Like new, black, low back. \$60 f/ both. Ferguson, X-3721 or 482-3240.

New Mauser Mark X. Cal 270 w/ adj trigger. \$160. Several pistols and Browning auto shotguns. 488-1846 evenings.

Several large oil paintings, \$30 - \$120. Also unused PACE 2000 SSB CB radio, \$210, and new 40-channel w/ LED, \$79. 488-1846.

5-ton A/C condensing unit. Good cond. \$125. Johnson, X-2021 or 946-7036 after 5:30 p.m.

### LOST & FOUND

Lost: Wedding ring. Plain Gold Band. In Bldg. 30 Oct. 24. Reward. Cliff, X-4582.

### WANTED

One person to join carpool w/ 4 others. Carpool leaves Meyerland Shopping Center at 7:15 a.m. f/ the 8-4-30 shift. Call Carl, X-4871, Cathey, X-6387, or Russ, X-4871.

Form or join carpool between JSC & Montrose/Westheimer area. Shift: 8-4:45. Mark, X-6360.

Interested in becoming a boys' baseball umpire f/ '78 season? Contact Tom Latham, 928-4420 or 332-2774.

Small girls' training bike w/ helper wheels in good cond. Doherty, X-3821 or 488-0182.

Will pay premium f/ JSC "Treasures of Tutankhamen Tour" reservation. Corcoran, X-5107 or 333-3484.

Need one working washing machine and one riding lawnmower, either working or needing minor repair. Mary, 486-0781 after 5 p.m.

Need new members f/ Baycliff Bass Club. Anyone welcome: meetings, tournaments, prizes. Parker, X-4241 or Mobley, X-4428 for info.

Will remove dead trees. Need firewood. Will remove unwanted branches or trees. Planche, X-6494 or 474-2660 evenings.

Need Sept 77 issue of "Scientific American." Erb, X-3057 or 334-3319.

Need ride from Slenderbolic Bldg. on Gulf Freeway. Shift: 8:30-5. No car; weekly rates. Mike, 644-3962 or X-4231.

Want to start play group of 4 2-yr-olds to meet ea wk f/ 2 1/2 hrs? 488-3235.

Need child's metal riding tractor in good shape. Barnett, X-4735 or 482-1539.

Need riders for carpool from W Loop, SW Fwy. Belfair area, 8-4:30. McLaughlin, X-5536 or 661-2974.

Firefighters needed! Men and women adult residents of CLC needed to join CLC Volunteer Fire Dept. Rewarding community service. You will be trained and equipped. Call 488-0023 any time.



## ROUNDUP

**NASA LYNDON B. JOHNSON SPACE CENTER**

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Photographer: A. "Pat" Patnesky

# David's suit: The people behind the scenes

(Continued from page 1)



**Fred Spross**

letter from the Baylor College of Medicine. The boy was then two and a half years old. Dr. Sue Criswell was working over in the laboratories in Building 37 on another project/contract with the Life Sciences Directorate at the time. Since she also happened to be with the Baylor College of Medicine, she became the major point of contact between the two groups and remained on the MBIS project about halfway through, mostly out of direct interest in the project.

Spross was Project Engineer on the Apollo Biological Isolation Garment, which works on a somewhat different principle than the MBIS. Since he was already familiar with spacesuits from his work with the Crew Systems Division and with biological isolation garments from his experience in the Life Sciences Directorate, Spross said he "just happened to be in the right place at the right time" to merge the two concepts into a project like this. He became the Project Coordinator.

The first thing to be done was to outline a program, and Bill Carmean, a Martin Marietta Corp. contractor, helped him. Together, they got people from the Baylor

College of Medicine and wrote up requirements for the suit. Then they canvassed the Center to find the expertise needed to build the system.

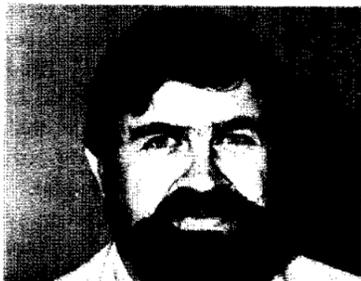


**Bill Carmean**

Naturally, everyone's space-related duties came first, not applications, so the project was accomplished on a noninterference basis. Another problem was administration — working out the legal and cooperative agreements with the Baylor College of Medicine and the Texas Children's Hospital. Even within the hospital, it had to be defined whether an item was to be considered a piece of test hardware or medical equipment in order to determine who could operate it. "Medical equipment" was the determination so that nurses and so forth could use the system. The hospital had their review cycles, and so did we.

Rick Sauter in the Engineering Division did a lot of work on the basic transporter design. He worked through Paul Ferguson who had the expertise in the manufacture of some of the unit components. The mobile cart, as explained in the photograph, had to be outfitted

with batteries, blowers, and dual control systems and circuit systems.



**Paul Ferguson**

Ferguson was charged with the task of environmental quality inside the suit as well as life support. The suit for David is not a spacesuit for



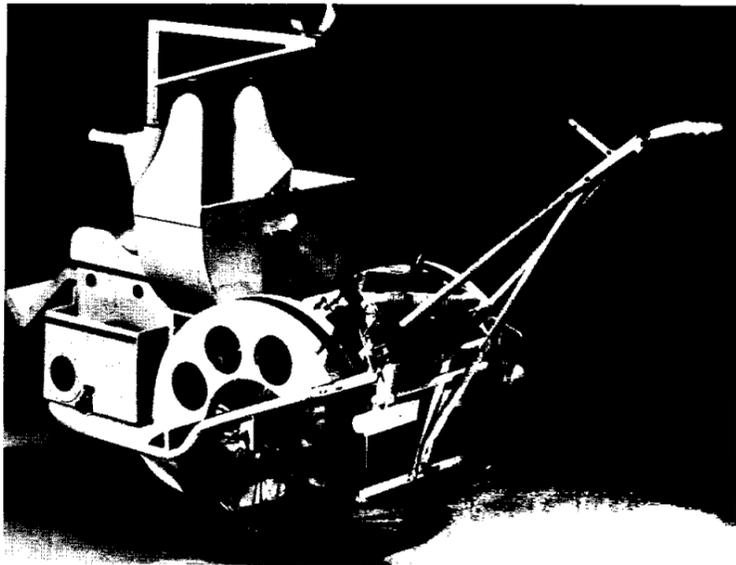
**Richard Graves**

astronauts in which the person inside can be just as contaminated as he would be outside. A regular spacesuit, explains microbiologist Dick Graves, is a pressurized garment to keep an atmosphere inside — a life support system. In this case, however, there was the problem of oxygen content versus carbon dioxide buildup; there had to be a certain washout there so the patient would not become depleted in oxygen. Ferguson, using his flight engineering experience, helped build up what is known as differential pressure and the electrical and mechanical systems to make David both comfortable and meet the requirements for the suit.

Bobby Miller and Bob Steele handled a considerable portion of the quality assurance and evaluation during the early stages of this development.

Then there was a lag in the project. But the suit and transporter had been developed and right here onsite they had what is generally known as an FRR, or Flight Readiness Review, but which was in this case a FIELD Readiness Review.

After the lag over legal agreements, which lasted over a year, Spross was on another project that took most of his time. That's when Gary Primeaux took over the duties



**SUPER-STOLLER** — Children often seem possessed of boundless amounts of energy, but any parent knows better. This mobile transporter, designed mainly by Paul Ferguson, is equipped not only with a seat for the child but many redundant systems, including batteries, filters, and air blowers.

Spross previously had on the project, and with the help of Bill Carmean, they went back to the



**Gary Primeaux**

hospital for an update. How many suits were needed? Were the requirements for the suit still valid? Could they arrange some kind of target date and schedule? When would some training for the parents and nurses take place? There were a few minor improvements and new input from various sources. There had been some "open" items, unresolved issues.

And David had grown.

The system was then presented as it was with the proposed changes and modifications added — but only minor changes. They started building the delivery items.

The helmet was found to be the only major design change. There were ruptures in the seam areas. Now the helmet is much superior. The inlet air duct is the main difference. A protective sheet was also added over the hose, and there were improvements in the ring areas, where the O-rings are sealed into the ring interface at the end of the tunnel.

Graves pointed out that coming from a sterile environment and going into a sterile environment was his main challenge as microbiologist. Once the MBIS with the child inside has been taken into the unsterile outside world, how do you get him out of the suit and back into his sterile living quarters without contaminating him or the inside of the suit? You can't bring him AND the suit back into the sterile living area.

So they decided not to try to keep the outside of the suit sterile. A connection through a tunnel and an adapter ring would serve the purpose much better. It only remained for Graves to work out a method to sterilize the connecting surfaces so that when the connection was opened up and David crawled back through, he would not bring any contaminants through the connection.

A considerable amount of testing and checking was done prior to the delivery of the suit. Several children of those who worked on the project became test subjects. The group even took the children down to Bay Area Park and played kickball or a game of chase using the transporter.

In late July, David had his special space suit which ended, at least partially, his six years of isolation. The suit will soon be tested at the Los Angeles Children's Hospital, where young leukemia patients, who are made immune deficient due to chemotherapy treatment, may also derive benefits from it or a modification of David's suit.



**PROTOTYPE SUITS AND TEST SUBJECTS** — They say that some children couldn't wait to get into the suit and try it out during various testing stages. "Others," says Graves, "wouldn't touch it with a 10-foot pole." This is Beth Sauer with the suit and the transporter, showing just what she is able to do during excursions. The hood of the suit has been somewhat modified at this time.

## Pollack speaks Nov. 28

Herman Pollack, Research Professor of International Affairs at George Washington University, will present a lecture to past and present Management Development Program and Professional Development Program participants and their guests on Monday, Nov. 28, from 9 - 11 a.m. in the Building 30 auditorium. The topic of Pollack's lecture will be "The Impact of Technology of Foreign Policy."

Pollack has been active with the U.S. Department of State since 1946. From 1964-1974, he served as Director of the Bureau of Inter-

national Scientific and Technological Affairs. Also, he was a member of the Commerce Department's Technical Advisory Board from 1975-1977.

In addition to his current professional duties at George Washington University, Pollack serves on the Commerce Department's Weather Modification Advisory Committee. He is also a consultant to the Office of Congressional Technology Assessment on Technology and World Trade to the Department of State on U.S./Japan scientific and technological relationships.

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## GEOS-3 scientists meet

NASA's first dedicated radar altimeter satellite, GEOS-3, has been an unqualified success. GEOS-3, the Geodynamics Experimental Oceanographic Satellite, was launched in April 1975 to measure ocean surface features such as wave heights, currents, tides, and sea surface undulations. From an orbital height of 840 kilometers, GEOS-3 has not only achieved all its design objectives, but additionally is accurately profiling land areas including flood plains, is locating sea ice as an aid to ship navigation, and is accurately providing previously unobtainable

surface contour maps of the Greenland ice sheet.

Fifty-three U.S. and international scientists have been analyzing the abundant data from GEOS-3. Their results were presented at a special GEOS-3 symposium at the Fairmont Hotel in New Orleans on November 18-19.

After more than 30 months in orbit, the GEOS-3 spacecraft remains completely operable, and the spacecraft systems are continuing to support a full complement of experiment operations.